

AD-A180 373

NATURAL LANGUAGE PROJECT (NLP)(U) JAYCOR ALEXANDRIA VA
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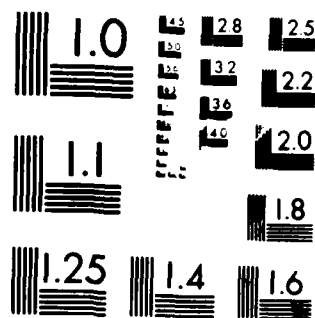
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AD-A180 373

Quarterly Technical Report

December 31, 1986

JAYCOR Work in Support of
The Navy Center for Applied Research in Artificial Intelligence
(Contract No. N00014-86-C-2444)

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1. Reporting Period

This report covers the JAYCOR effort in the Natural Language Project (NLP) project from September 12, 1986 to December 31, 1986.

2. JAYCOR Personnel Involved

Kathryn Di Benigno

3. Financial Status

See graph on third page.

4. Comments

▲ The tasks which are being addressed during this phase of the contract are the following: design of a control strategy, design of interacting knowledge bases, inferring information within and between knowledge bases and derivation of concise, relevant summaries. At this point in the project, we have mainly been concerned with the design of a control strategy and the interaction of knowledge bases. The following will describe our work and future plans with respect to these subtasks.

4.1. Current Work

We are currently familiarizing ourselves with a new expert system shell called KEE. In order to do this, we are porting the original SUMMARY system over to this system which runs on a Symbolics computer. In addition to translating the system from the YAPS language to the KEE language, we must also translate any lisp code from Franz Lisp to Common Lisp. With only a few technical difficulties remaining, the original SUMMARY system (excluding the new domain model) has been ported over to KEE. In terms of control strategy and knowledge base interaction, this system behaves in much the same way that the YAPS version did. It was our intention to mimic the original system as closely as possible so that the KEE version could be verified as being functional and thus make sure that our understanding of this new expert system shell is adequate.

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Once the minor technical difficulties are worked out, we will begin to port the equipment domain model over to KEE. We will begin experimenting with different control strategies and methodologies during this phase. The reason that the experimentation is delayed to this point is that the original rule bases from the YAPS version, are written in such a way that great variations in strategy are not possible. The rules are dependent on the order in which they fire. There are two possible ways to handle these rule bases, both of which have been tried in several YAPS versions. The first way is how the system is currently modeled. This method entails grouping the rules into 3 separate rule bases and applying these rule bases in a strict order. The second method is a goal directed method in which all the rules are grouped together in the same rule base, but through the use of goal seeking strategies, the proper sequencing is achieved. This second method makes use of an opportunistic strategy. This rule base, no matter which method is used to implement it, is highly deterministic and introduces into the system, absolutely no uncertainty. There is never a case where this rule system produces two competing hypotheses and a choice is made through some reasoning process.

4.2. Future Work

The equipment model and the associated knowledge sources is quite a different story in terms of uncertainty and determinism. It is possible to introduce several competing hypotheses when attempting to match referents from the discourse to items in the equipment model. Because of this uncertainty, we believe that the *truth maintenance* mechanism provided in the latest version of KEE will provide us with an interesting solution to these problems. This ability is provided by KEE via the use *worlds*. We plan to model all the different scenarios introduced by ambiguity in the discourse by using these worlds. Worlds will be poisoned off by the application of increasingly greater amounts of knowledge or heuristics up until a point that a choice cannot be made and a truly ambiguous situation has been found or only one possible world remains. At first, we will allow the system to generate any number of worlds that are possible. If we encounter serious efficiency problems with this unconstrained approach, we will introduce a control mechanism which will limit the generation of worlds to the ones which seem to have the most potential as a solution.

In addition to these tasks, we will also experiment with the use of the graphics facilities provided in KEE in order to provide a visual picture of what the system is doing. KEE provides the user with built-in facilities to animate or display arbitrary objects, charts, meters, and text on the screen while the system is running. This facility should prove to be very useful for developing systems for demonstration purposes, quickly.



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